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WIDEST SENSE

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THOS. H. McCOLLIN, Managing Editor.
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THE COMPOSITION OF A SINGLE HEAD.

CHARLES ESTERBROOK.

TO give to a single head grace, nature, ease and all that which makes a picture attractive is one of the difficulties with which portraitists have to contend, and it is worth enquiring what are among the causes which contribute to success in this particular.

Extraordinary beauty or an expression which speaks a silent language to the beholder—one with which we can hold converse—is the first and highest quality in a single head. For it is obvious that when so little of a figure is seen, the only excuse for representing it doing nothing is because it is worthy of being looked at. A particular dress is often considered a sufficient reason, but it is seldom admired—unless by a seamstress,—if put on an unattractive person.

In the next place, all the powers of fascination which art possesses are necessary, even with a beautiful and expressive countenance, to make so abridged a representation truly effective and equivalent to pictures which contain more.

It may be observed that every picture, no matter what it contains or represents, should be calculated for the effect it will produce when brought in comparison with other excellent work in an exhibition. For instance, in a gallery of paintings we find that a single head of Rembrandt's, or some of the other great lights, will bear down before it large masses of figures by inferior painters. So that it is not because it is part of a figure or a small

picture that a head must necessarily be without much interest. The fascinating effect which is produced by the powers of light and shade requires the hand, science and experience of a master, and to attempt to show in what that fascination consists would be to unveil, were it possible, all the resources of the art. We can, therefore, at our coming convention study the effects produced by our great lights of the profession and imbibe their principles without being able, perhaps, to reduce their general principles to a formula for our guidance. But in minor things there are some observations to be made on the general practice of the best portrait photographers.

The placing the head rather high on the plate is always to be observed ; the contrary proceeding gives the idea of a short person, or the impression that we might have some more of the figure. The next thing to attend to, which is not so easily done, is to avoid a truncated appearance at the lower edge of the picture, where the arms and body are cut off by the mount or frame.

When the bend of the arms can be shown, they look less glued to the sides of the figure, but even a very graceful action of the arms, when cut off a little above the elbow, may produce a very unpleasant and awkward effect. The action itself, has, however, something to do with this, and it is better to let the portions of the arms take the direction which is least unpleasant without thinking what becomes of them afterward, than to imagine a complete action, which may not, as above observed, be pleasing seen piecemeal. The safest way, however, to get over this truncated appearance, is either to lose the lower part in drapery, or to merge the outline, if seen, in shadow or light, in short, to do away with the idea of division and cutting off, by hiding the intersection. Skillful vignetting adds much to the beauty of the effect, but in ninety-nine cases in a hundred it is very inartistic.

The making the head conspicuous is indeed the *sine quâ non* of this branch of the art, and would only be neglected by an artist who had theorized himself out of the first and obvious requisite of a picture, viz., that the greatest attention must be paid to, or at least directed to the parts which are most important.

The grace and ease which are sometimes eminently pleasing in pictures of only head and shoulders, depend on truth of proportions.

To render a common and natural action well, seems, in so small a portion of the figure, a matter of little difficulty, but if it were not really extremely difficult we would see it oftener well done. The cause of failure generally is the fitting on of a neck and shoulders to a face without studying the harmony of the action as well as the proportions. Too little regard is taken of the principle which we see carried out to such perfection by the ancient Greek sculptors, of suiting the action of the body to the expression and pose of the head. A torso, a mere trunk, of the exquisite work of Phidias or Praxiteles is often all we possess, yet from the wonderful truth and harmony of the mutilated remains we can conceive the pose and beauty of expression of the head and countenance.

Photographers care little for the natural pose of the body; often the head is all out of harmony with it, and the picture leaves upon us an unpleasant impression, because it is unnatural.

The more the representation is confined to the head, the more the head should not only be effective and attractive, but the more it should have in it an expression and appearance which in nature would force us to forget the rest of the figure. A mere head, perhaps, is always best represented looking at the spectator, and, if it has a depth of expression and something uncommon which realises or accords with some unuttered thought, in addition to all the other charms of light and shade effect, it will rivet the spectator's attention. But it is much better in fancy subjects, where an artist is not tied, to introduce the hands.

The difficulty of getting over the truncated effect is greatly diminished, and, what is of more importance still, a definite and noticed expression can be given throughout what we see of the figure. It is true some difficulties are increased, such as the skillful management of the light, now rendered complicated by the spots of light formed by the hands, the paramount necessity of making the general masses take pleasing shapes. The hands, when thus introduced, should only serve to increase the expres-

sion of the head and the general beauty of the picture ; but a more positive part they should not play.

The actions and feelings of a figure in a portrait or fancy subject of this kind are sufficiently limited if reduced to those truly interesting. We must always remember that the picture is supposed to exhibit the particular mind of the human being represented.

A man with his hands extended as if speaking to or about to receive one who addresses him, may be excused if the artist desires to express some individual peculiarity, but is worth nothing as a means of affecting or impressing the spectator. To do this the person represented must do something or look something which exhibits him in his essential and peculiar character, not his accidental and common character. A deviation from such a principle is less pardonable in fancy subjects, because the character there is left to the artist's own choosing, and a work of this kind is even less interesting than a portrait.

In ideal subjects it is obviously safest to let the character and expression agree with the age and sex of the person. A lovely woman for instance, will be more attractive because more generally natural, with an expression of tenderness, melancholy, innocence, hope, devotion or benevolence, than with a look of profound meditation or grief.

Next to expression should be considered all that contribute to heighten the effect of this union of the physical and moral character. Titian makes his female heads really women by the flow of soft, luxurious hair waving with part loose on the shoulders. The Greeks represented women round in outline and relief. Titian had a peculiar penetration in catching what is truly nature: his half-tints are composed of imperceptible gradations on the cheeks, forehead, neck and bosom, and thus the features tell with power.

The greatest contrasts in the figure have been placed by nature in the head, where the shadows of the hair give value to the face, and in the face (where all the features should tell more than any accidental shades), the eye has more contrast for its lightness, darkness and sparkle, more than any other feature.

CONCERNING THE TONE OF DEVELOPED ARISTO. PRINTS.

R. ED. LIESEGANG.

THE composition of the developer for copying-out papers is something entirely different from that intended for the development of gelatine dry plates. If one should place a slightly printed proof in the latter developer the result would be a uniform blackening of the whole surface and no image at all.

The fluid at the most dare only be very slightly alkaline (acetate of soda is generally employed), but the developer is generally acid or neutral.

One should bear in mind that the silver nitrate is much easier reduced than the silver chloride. The separation of the metal must not proceed too rapidly. For just upon the slow, gradual separation depends the possibility of the physical development. (This kind of development is called physical, in contradistinction to the chemical development of plates.)

The substances employed in this physical development of copying-out papers, are, in general, identical with those employed to call forth the image in the dry plate. One, however, the oxalate of iron, is unsuitable ; likewise Amidol. Hydrochinone, Pyrogallol, Metol, Paramidophenol, Pyrocatechin, may be made use of. Gallic and tannic acid, which are inapplicable to dry plate development, may be advantageously employed.

According as these various developing agents are employed upon gelatino-chloride paper, different tones, gradations, etc., are attainable. For the metallic silver is not reduced in the usual black form, but assumes a variety of colors. For instance, the same picture may be developed with gallic acid and with hydrochinone ; the former giving a greenish-black tone, the latter a foxy-red. Besides, the addition of more or less acid or alkali to each individual developer has a marked influence upon the tone. The acids favor the formation of the red form, the alkali the production of the green form of silver. So it is possible, as we shall show further on, that gallic acid will give a red tone, and, on the contrary a brown-black.

From the characteristics of the individual developing agent one is able to say that it has a tendency to a certain tone under normal conditions. No comparison can, therefore, properly be made between this physical development and the chemical development of gelatine plates..

Inasmuch as the silver deposit in the dry plate negative is invariably black—at the most with certain dry plate developers, as, for instance, pyro and pyro-catechin, a yellowish or brown color is formed. But these colors depend, not upon any special silver modification, but upon an organic color product, the product of oxidation of the pyro or pyro-catechin—these oxidation products have no influence in physical development of paper prints.

The analogy is somewhat closer with chloride of silver pictures. It is well known that these enlarging papers, which are prepared with pure gelatino chloride of silver, assume with under-exposure a greenish tone, but with long exposures take a reddish tone. Here also the tone depends upon the peculiar modification of the metallic silver.

If two copies upon the same paper from the same negative, one very slightly copied, the other half done, are placed in the same gallic acid developer, the first will exhibit a green, the last a red tone if fully developed and then fixed. This corresponds with the action of the chemical development of the gelatino-chloride paper. Moreover, by employing both varieties of paper and methods of development, I have proved that it only indirectly depends upon the time of exposure.

With long exposure under the same negative it is necessary only to keep the paper a short time in the developer to secure full strength ; with short exposure under same conditions, it must be kept much longer in the developer.

The duration of development determines the tone. If a short exposure is taken out of the developer before attaining the full strength, it will exhibit the red tone.

It is the intention of Doctor Liesegang to publish a work on this interesting subject, which will probably be issued next month, at Düsseldorf, Germany.

THE SLOW DEVELOPMENT OF SNAP-SHOTS.

FREDERIC DILLAYE.

THERE is no denying the fact that instantaneous photography has taken its stand victoriously in the ranks of our art! That and the bicycle are now the two great tempters which have us in their power. Considering everything there is no great harm in this, but, on the contrary, there may be much good if we submit intelligently. A great many artistic impressions and nearly all the grand effects of light can only be satisfactorily secured by snap-shots. Nevertheless, I own I have often said and written that instantaneous pictures are unsuitable to the art, because of the difficulties in developing them so as to render a harmonious whole. If then, by the actual means of working which are at our disposal we can manage to recover this harmony, it will be possible to get first-rate artistic results from instantaneous work. Now, all the series of experiments which I have made for more than a year, lead me to the conclusion that a slow, even a very slow, development of snap-shots will better bring out this harmony in the print.

In Germany, Dr. Meydenbauer found that by leaving a decidedly under-exposed plate for several hours in a greatly diluted slow developer, he obtained far more detail in the shadows than by using a concentrated developer or even the recognized normal strength. Dr. Neuhauss confirmed these results. Both used pyrogallic acid which is after all the most perfect developer which we possess.

In France, the late Commandant Fourtier, recognized the truth of these facts while using hydroquinone.

No more was necessary to decide me to make experiments, towards which my experience and a secret longing drew me. And I have made these experiments, no only with all known developers, but also by using certain of them together. I will say here that those which lend themselves best to this kind of work are: pyrogallic acid, amidol and also pyrocatechin. As mixed developers we have pyrogallic acid mixed with eikonogen, then in a less degree, eikonogen with hydroquinone, and pyrocatechin

with hydroquinone or amidol. I say in a less degree, because developments in which hydroquinone takes part, cannot pass a certain degree of slowness without there being a danger of obtaining that famous yellow fog given by hydroquinone, and which completely prevents all good printing.

But why this slowness in the bath, when it is generally admitted that in developing snap-shots all failure of the action of the light should be remedied by an augmentation of the action of the developers ? First, because a slow bath, in the same way as in engraving with acids, gives more softness and fineness to the picture. Next because in developing snap-shots a fog is always liable to show itself on the plate, and to show itself more intensely according as the exposure has been shorter and more quickly in accordance with the increased concentration of the developer. The image is barely visible on the sensitive surface before the fog covers it so quickly that the development can no longer be watched, so the fixing is done and the final result lacks depth and has no detail in the shadows, and shows along with general weakness too great a contrast in light and shade.

This fog is known as the under-exposure fog, and is produced by a certain quantity of luminous rays passing through the lens and being diffused in the camera after having struck the partitions. If a shutter with a central opening is used, it is still more augmented by the diffraction produced by the very small opening at the beginning and end of the exposure, thus producing a lighting by which the image does not benefit in the slightest. In time exposures the action of the luminous rays is strong enough to surpass and even annihilate the effects of this diffusion.

There are really good reasons in favor of slow development. But we develope ordinarily with flat dishes, so that if we prolong our development during several hours, deposits will, without fail, settle on the plate, unless the dish be rocked, which ought to be done automatically not to be tiresome. And also the fact that each plate would take hours for the picture to be complete, would be sufficient to deter us from this method of developing our instantaneous negatives, which on account of the ease with which they are obtained, we take by dozens and dozens.

Therefore to make slow development practicable, we must abandon the flat dish, and find another method of working. There is nothing more simple than this. We have only to substitute an upright for the flat dish. The uprightness itself, and the large quantity of liquid necessary allow several plates to be submerged simultaneously. Further the monotonous rocking which is necessary for flat dishes is done away with. In fact, in consequence of the variations of density which the developer assumes during the process, it is in a constant state of rising and falling, thus forming a continual and automatic stirring up.

Upright dishes are easily obtained through the trade, these are intended really for the washing and even for the fixing of negatives. But I do not hesitate to say that they are altogether unsuitable for developing dishes. First, the plates are too close together to allow of a good stirring up, and next they are too near the bottom not to be influenced by the chemical residues formed during development.

But the "Comptoir-Général de Photographie" in order to apply this method to Carpentier's opera-glass cameras, now so much used in instantaneous photography, has constructed upright dishes which work well.

They are composed of two hardened black cardboard tubs with equally black ebonite racks for immersions. The smaller vessel contains the developing bath. The larger, covered with cloth serves as a cover for the smaller. The racks are furnished with vertical grooves into which the plates are slipped. For small plates these grooves are about half an inch apart. The racks are further fitted at both their upper and under corners with ebonite feet. It is noticeable that not the smallest portion of metal is used in the construction of these dishes. By means of these feet, the plates are raised about 1½ inches from the bottom, and the bath can also pass over them to a depth of 1½ inches.

In the case of small plates about eighteen can be developed at once. So if we can reckon an hour and half for development, this corresponds to a duration of five minutes for each plate, which shows that this slow development is in reality very rapid.

With a little practice and a knowledge of the temperature at the

time of developing, of the reducing action of developer used, of the rapidity of the plates and the time of exposure, the bath can be mixed in such a way as to take a night to act, and so the worker can sleep tranquilly—while still working. I would not, however, advise this extreme to a beginner. Being ignorant of the conditions just described, he would infallibly fail, the most common form of failure being the complete metallization of the plates. Considering everything, moreover, though slow development is good, one too slow is no improvement, or at any rate, has not so far given me better results with the snap-shots permitting this treatment. In summer the bath must be regulated to take from an hour and a half to two hours and a half. In winter the same bath without warming would take from four to five hours.

Not to leave you the difficult task of choosing from a large number of formulæ, I will give only one, but it is the one I always use, and so can recommend from experience.

Pyro Soda—First of all the following solutions must be made :

A

Boiling water ..... 34 ozs.*
Sulphite of soda ..... 5 ozs.

Allow it to cool and filter carefully.

B

Solution A cold ..... 3½ ozs.
Pyrogallic acid ..... 1 dr.

C

Distilled water ..... 3½ ozs.
Bromide of potassium ..... 2½ drs.

D

Warm water, having boiled ..... 3½ ozs.
Carbonate of potash ..... 3¾ drs.
Carbonate of soda ..... 8 drs.

These solutions ready, the developing bath is composed in the following proportions :

* The weights and measures in this article have been transposed from the French weights and measures and are as nearly correct as possible.

Cold water	6 pints.
Solution A	3 ozs.
Solution B	1 oz.
Solution C	½ to 1 dr.
Solution D	½ to 3 drs.

To augment the time of action the maximum of C and the minimum of D must be used, and *vice versa* for diminishing it. For well-lighted pictures the time mentioned above will give the maximum of intensity. In other respects there are certain rules on which slow development should be based.

Constant use of pyrogallic acid has proved to me that 4½ grs. are necessary, but sufficient to develop normally a 7 by 5 plate to a good intensity. This is the smallest quantity which must be used.

To keep the bath from staining the fingers so quickly, a strong addition of sulphite of soda may be made. The retarding action will be augmented by a weak addition of the alkali used, and a further augmentation is secured by adding bromide, which also prevents fog from spreading and preserves the purity of the whites.

So for a plate 7 by 5 a developer of the minimum force must be made according to the following formula :

Cold water	q. s.
Solution A	3 drs.
Solution B	1½ drs
Solution C	¼ dr
Solution D	1 dr.

In this way the shadows are very transparent, the high-lights very bright, and there is a perfect harmony in the whole which is the desideratum to be realized.

So if we consider that eighteen plates, 2¼ by 3½, have a sensitive surface equal to that given by four plates and a half, 7 by 5, we shall be able to mix our slow bath, minimum, for a full charge of the opera glass camera, 2¼ by 3¼, by simply multiplying the preceding quantities by 4½, thus :

Cold boiled water	q. s.
Solution A	13½ drs.
Solution B	7 drs.
Solution C	1⅛ drs.
Solution D	4½ drs.

On the other hand, if we remember that to conserve the qualities mentioned above transparency of the shadows, brightness of the high-lights and harmony of the whole—not more than 7 grs. of pyrogallic acid must be used for a 7 by 5 plate, we shall be able to make an almost maximum bath with the following quantities :

Cold boiled water	q. s.
Solution A	3½ ozs.
Solution B	1½ ozs.
Solution C	2 drs.
Solution D	6½ drs.

At the same time, in the case of a simultaneous development of eighteen plates in an upright dish, the quantity of water being very large, this maximum may be further forced without inconvenience, up to 46 grains of the acid. In these conditions I consider the following bath as maximum :

Cold boiled water	q. s.
Solution A	5 ozs.
Solution B	2 ozs.
Solution C	2¾ ozs.
Solution D	1 ozs.

The bath can be modified at will, within the limits I have mentioned.

Before each operation the dish and racks should be washed, dried and very carefully rubbed, and the dish, not containing the racks, should be filled within an inch and a half from the top with cold boiled water.

For plates, 2¼ by 3¼, the preparation of the developing bath must be continued by pouring into the dish about 3 ozs. of solution A, following, for instance, the first constitution of the formula given. Stir with a glass rod to ensure perfect mixing.

Then add 1 oz. of solution B, and stir ; next 1¾ drs. solution

C, again stirring; lastly, 2½ drs. of D, and stir for several minutes.

Particular attention must be paid to the successive stirrings of the bath before the introduction of a new constituent, as it is very important that the different chemicals should be thoroughly mixed. The plates immersed in the bath will then be evenly attacked.

For plates 1½ by 2, the dish being smaller, the constituents (always with the same formula) should be used in the following proportions:

Solution A	2	ozs.
Solution B	5⅔	drs.
Solution C	1	drs.
Solution D	1	drs.

The bath being ready, the racks are successively immersed. The exposed plates are then taken separately, rubbed vigorously with the velvet pad and dusted with the camel-hair brush, and are slipped one by one into the grooves of the racks. A rocking movement from top to bottom is then given to each rack, so as to detach any air-bubbles which may have formed on the surface of the plates.

It is a good plan to put all the plates in the same way, i.e., with the gelatine side facing the glass side of the next one.

The dish is then re-covered, and the worker can go away and do something else.

Plates exposed in summer with a good sun in full daylight, will attain their maximum of intensity in from 2½ to 3½ hours, according to the different actinic degrees of tones in the subject.

Plates exposed under the same conditions in winter, and developed at an ambient temperature will need an immersion of 4 or 5 hours to obtain the same result.

In both cases the duration of the action of the bath will be reduced by at least a half if the last constituents of the formula, indicated as maximum, be used. The negatives should certainly be left in the bath for the length of time indicated.

It would, however, be possible on account of the variations of temperature for the automatic stirring of the liquid to act irregu-

larly, so making the negatives streaky. It would be a good thing, therefore, to return to the laboratory half an hour after the negatives were put in, or a quarter of an hour in the case of the maximum formula, and, uncovering the dish, to turn the plates the other side up.

According to the emulsion, even on plates of the same brand the image does not always appear in the same way : sometimes it does not show itself on the gelatine surface, and its appearance must be watched on the back, where it comes out more and more clearly ; sometimes, again, it can be followed all the time on the gelatine surface, and can be seen very little, if at all, on the back. In all cases it can be continuously followed by transparence.

However, when the back of the plate is uniformly gray and when the high-lights appear as shadows, the development, when the image cannot be followed in either of the above ways, may be considered as complete.

Then come the operations for finishing the negative, fixing and hardening.

The best way again is to do these processes in upright dishes. In default of them, horizontal ones divided into compartments can be used.

For finishing the negatives in the best possible way to preserve the softness, purity and brilliance of the picture, two baths for successive fixings and an alum bath are needed. The first fixing bath fixes the negative. The second takes away the double hyposulphite of silver, formed during the first bath, and which is one of the causes of subsequent deterioration. It also continues the fixing to the bottom and relieves the shadows of all stickiness. The alum bath reduces the hyposulphite in a certain measure, clears the high-lights, removes slight fog, and tans the gelatine, so that the negative will not need varnishing for protection against damp. It is well to note, however, that the alum bath would make the operations of intensifying and reducing, if they were necessary, very difficult.

The first fixing bath is made with an aqueous solution of hyposulphite of soda 25 per cent. The second is obtained by making a 20 per cent. solution of hyposulphite of soda, to which is added

about 1½ drs. of pure liquid bisulphite for each 3½ ozs. of the solution.

The alum bath is composed of a 6 per cent. aqueous solution of potash, with about 51 drops of chrystallizable acetic acid added for each 3½ ozs. of solution.

The plate, when removed from the developer, is rinsed under the tap and put into the first fixing bath. In very hot weather, to prevent frilling, this rinsing is replaced by an immersion for five minutes in cold water.

As soon as the milkiness disappears from the back, the fixing is finished. It will be almost always noticed that there remains on the back, a light opalescent tint which persists, although the fixing is complete. It does not, in any way, influence the transparency of the negative. The plate is then immersed, without washing, in the second hyposulphite bath. Washing between the two baths would make insoluble the hyposulphite of silver formed in the film during the first bath. It should be left, at least, ten minutes in this bath. It could be left longer without inconvenience, as the hyposulphite does not attack the silver reduced by the developer, until after several hours of immersion. After the second fixing, the plate is washed and immersed for another ten minutes in the alum bath. In summer, if there should be the slightest trace of frilling, the quantity of acetic acid in the alum bath should be diminished.

The negative, after fixing, must be immediately washed under the tap until the water flows evenly on the gelatine without forming streaks, and then be put into the washing dish, and left for an hour or two, or even five or six, if the water in the dish is not renewed.

The drying is done in the ordinary way.

After development, the bath cannot be kept for further use, as very weak developers do not keep. Therefore, a new bath must be made each time.

Time exposures can be developed in the same way as snap-shots. The time of immersion in the bath is shorter, that is the sole difference. Therefore, all plates can be put into the same bath, without any fear, whatever, of the length of the exposure.

The less exposed will need a longer, and the more exposed a shorter immersion.

It will be noticed, however, that the total apparition takes place from the beginning of the development, as the image reveals itself at the same time in the whole thickness of the emulsion, and this is the principal cause of its softness, harmony and fineness. The whole process consists, then, in watching, so as not to surpass a good degree of intensity necessary for making the prints.

If it is not wished to let the bath act automatically, a bath similar to the first can be made in an upright dish, which, however, must only hold about 3 ozs. instead of 6 pints. Then in this bath, say normal, the plate must be immersed on the total appearance of the image, and the development is continued by the worker's ordinary method.

My closing advice is never to develop snap-shots until about forty-eight hours after having taken them. The molecular vibrations of the sensitive matter do not stop immediately the shutter is closed, but continue for some time after.

Not only are snap-shots treated in this way, remarkably distinct in the shadows, but their special feature is the entire absence of thickness in the dark parts of the negative. The result is, therefore, a far greater harmony between the lights and shadows, which, from the mere fact of short exposures, would otherwise be hard. Also, the skies and all the effects of light accompanying or forming the ground-work of the subject obtained by this method, are excellent for printing from.

So this development has the particular advantage of admirably preserving the skies and all the effects of light, while giving a negative both vigor and transparency, therefore, specially suitable for enlarging. And enlarging is one of the best methods of succeeding in photographic art.—Translated from "Les Nouveautés Photographiques." ("Practical Photographer," May.)

DEVELOPER FOR INTENSE NEGATIVES.

Perchloride of Iron	60 grains.
Citric acid	120 "
Chrome alum	40 "
Water	32 ounces.

HOW TO CHOOSE A VIEW SUITABLE FOR AN ARTISTIC PHOTOGRAPH.

GROUPING is really a universal law of nature formulated by art, and not, as one is apt to suppose, a mere product of arbitrary principles established by art teachers.

Nature pleases the eye in the disposal of objects by the subordination of many to one, that is, by giving unity in variety. The eye, however, must become trained to an appreciation of the beauty of composition, and it may not be amiss to give a few hints on the selection of an artistic view.

Two photographers may focus upon the same scene ; the production of the one will be a picture, the work of the other a mere topographical survey. Why is this ?

First, I suppose, the one possesses an inherent taste for the beautiful, while the other does not ; and so, it may be set down as a photographic axiom, that taste and judgment are demanded as essential to artistic work ; but many possess these qualities, and only need guidance—how to look at nature.

But before we start out let us advise the amateur to study the peculiarity of his lens, for much of the art qualities of the picture depends upon the nature of the lens employed. Some lenses are short-focus, others long-focus, and while the perspective of both kinds is absolutely mathematically correct, the pictures focussed upon the ground-glass are not always in accordance with what is presented to our eyes, and consequently not always according to our taste. Of course, there is no lens which gives exactly what our eyes see, because the pleasure in beholding nature is not dependent upon accuracy of visual focus. But the lens, to give an artistic picture, should approximate in character the human lens.

It is not a bad plan to hold up vertically in front of you a light frame of wood the size of your ground-glass, and look at what you see through it and imagine it is the picture you are going to photograph. Move the frame about until you get within it what you want, then look at the image of the same view focussed upon

your ground-glass and compare the two. Very likely you will find that your eyes have taken in considerably more than your lens, but the distant objects by your lens will seem rendered much larger than they really ought to be. In a painting they are smaller than they appear to your eyes, but not actually, for your judgment in seeing things at a distance whose dimensions you know, modifies their apparent dimensions, and it seems to you proper to exaggerate distance to produce a good effect, for a picture addresses itself to our æsthetic taste more than it does to our actual vision. So a certain latitude must also be given to our rendering of distant and near objects in a photograph, and we must not use a lens which dwarfs too much the far off mountains, making mole-hills of them.

To direct the camera to any object or scene in nature and expect from accuracy of focussing, proper timing and development, a pleasing, or even satisfactory picture, is simply absurd. The press-the-button formula will not accomplish much in artistic photography. Good taste is synonymous with good judgment; it is really the judgment which exercises the power of selection from nature.

The operator should have constantly before him the general effect to be produced, not the effect by any one portion of the picture he sees upon the ground-glass, but he should strive to have the different parts of the picture harmonize and not let any object be too obtrusive, either from its unsightliness, or from its prominence even though it be pleasing in itself. All such portions of a picture direct the eye at once upon them and so hurt the general pleasing effect.

The amateur should remember that a foreground is as necessary to the picture as a middleground or extreme distance, but he should likewise remember not to overload it with too many objects, nor yet to make it so bare as to destroy the balance of the picture.

Avoid scattering subjects, that is, views in which there are a great number of objects spread about and receiving nearly the same degree of light and shade. Such scenes have no contrasts.

the quiet and repose of one part does not set off or emphasize the energy of the other. The picture is what photographers or artists call flat and tame.

Do not get the subject too high on the plate. It is generally best to keep the horizon a little below the centre of your plate unless the foreground is exceedingly interesting. A good deal of sky adds to a picture and gives it additional interest, especially if you can get clouds in it.

Figures add much to the artistic beauty of the scene, and help to break up a motionless foreground, but be careful to group them properly, and not to scatter them over the scene like sentries on a watch. Avoid repetition of straight, unbroken lines either horizontal or vertical, or crossing at right angles.

The two sides of a landscape should never balance. There should be a small and a large mass, and generally the interest should centre in the small mass, but it should be connected in some way with the larger.

A scene lighted all over is never as effective as one in which the highest light is concentrated to a certain limited area. There ought to be a range of tones from this high light down gradually to the darkest part of the picture. A picture ought never to be mere black and white.

There are three things to be considered in composition : the management of the foreground, the middle distance and the extreme distance. The first gives force to the scene ; the second gives variety ; the third, sentiment or poetry. Slight the foreground and the picture is weak. There is no place for the eye to start from to take excursions over the distant fields. If the extreme distance is omitted, the view has too much of a shut-in look. Oh let us always have that little peep betwen the hills with its hazy softness. We cannot always get the distance in its proper value, but let us never neglect the opportunity, when presented. And last of all, watch the sun and notice the broad shadows which the flying clouds cast upon the scene in certain parts. Possess yourselves always in patience and wait for the favorable moment, and never risk a plate upon a view that does

not excite in you a feeling of exultation. The value of the plate is not to be considered, but the danger of losing your fine perception and estimation of the beautiful is to be seriously considered.

Our plates are rapid, but snap shots on landscapes are seldom satisfactory to those who love wealth of gradations and softness in a picture. Foliage is apt to be rendered with too much contrast; the shadows of the trees are in much greater obscurity, photographically, than you would believe, and the top and branches so receive an excessive lighting. A quiet day is still the best time now, as it was in wet plate days, for landscape work.

"No stir of air was there
Not so much life as on a summer's day,
Robs not one light seed from the feather'd grass."

This would be just the ideal place for a view.

J. B.

THE SWING BACK.

THE swing back has been somewhat prominently to the front on more than one occasion lately, and, as considerable misconception appears to exist in some quarters as to its proper use and function, we make no excuse for once more bringing the subject forward.

In his paper, read at the Camera Club Conference, Professor Allen made some pertinent and really valuable remarks of a thoroughly practical character, and these have been brought forcibly back to our notice by more than one communication we have received during the last few days with regard to the illustration accompanying an advertisement in our own and other pages last week. Professor Allen says: "It is more than probable that the human eye sees vertical parallel lines of considerable altitude as though they slightly converged. At any rate, if a high tower be taken with a wide-angle lens and swing back quite vertical, it seemed as though it was wider at the top than lower down; it seemed, in fact, top-heavy and swollen." This is just the point in connection with the illustrations referred to that our attention

has been called to by two or three correspondents, who seem inclined to attribute the effect to the particular camera employed, which we need scarcely say is a thoroughly groundless assumption.

It is, as Mr. Allen says, more than probable "that the eye sees parallel vertical lines as if they were convergent"; it is a fact that is open to very easy demonstration, and in consequence, when the eye looks upon the representation of such vertical lines in the form of, say, the Tower and Gateway of Christ's College, Cambridge, rendered with strict parallelism, it instinctively feels that something is wrong, and resents it. If our readers will refer to the illustrations in our last week's advertisement pages, they will recognize, if they have not already done so, what we mean, and will feel that Mr. Allen's description of the effect is a most accurate one. Yet, if the lines be gauged carefully, they will be found to be perfectly accurate, in so far, at least, as their perpendicularity and parallelism are concerned, and the apparent "swollenness" is merely an optical illusion.

Many novices in photography, and for that matter many old hands, are under the impression that, if a rectilinear lens be employed, and the plate swung in a truly vertical position, all the requirements of perfect accuracy have been complied with, and such would, no doubt, be the case if the task were merely the copying of a picture; but, when applied to an architectural subject, such as the gateway above alluded to, although the result may be satisfactory in the light of an architect's elevation, it is inaccurate in perspective and artistically unpleasing. In saying this, we are in no way desirous of under-rating the usefulness of the swing back; far from it, for the best possible rendering of that subject, the gateway of Christ's, without either swing back or front, would be hideous in the extreme—in fact, we must confess to having given that particular subject up in despair when on a visit to Cambridge some two years ago. We are reminded of Shakespeare's dictum, "It is excellent to have a giant's power, but it is tyrannous to use it like a giant," and in applying the swing back, as Mr. Allen says, a "compromise, a slight readjustment can often be used with advantage."

We are quite aware that there are many who will argue that any departure from the strictly vertical and parallel is wrong ; indeed, some years ago, in the early " seventies," if we remember rightly, the question of the " morality " of the swing back was raised before the parent society—then the London Photographic Society—by, we believe, the late J. R. Sawyer. At any rate, that gentleman championed the slightly converging view, and pointed out the obvious absurdity of representing the Clock Tower of the Houses of Parliament, when viewed from its base, by means of parallel lines. However, the members of the old " London " made the subject lively through two or three meetings, but what was the decision arrived at we do not remember ; probably a number of members " remained of the same opinion still."

Should any doubt exist on the subject of the actual convergence of the lines of such a subject as, say, the Victoria Tower, let a piece of card be held at a convenient distance from the eye, and, with a fine pencil, mark the width of the Tower as it appears to the eye at the line of sight. Now repeat the operation, taking care to preserve the exact distance between the eye and the card, as high up as the lines retain their parallelism, and compare the two measurements. If the second one is not *considerably* smaller than the first, then we can only say that the retina of that particular observer is fitted with an automatic swing back ; but the matter can be proved mathematically by calculation, or, more simply still, by plotting out the lines upon a sheet of paper, by which means it is easy to show that the angle subtended by an object of any given dimensions becomes gradually smaller as its elevation increases. The difference is proportionately greater the closer the observer is to the object or the wider the angle of view, and thus it happens that, with wide-angle lenses, and such subjects as the gateway of Christ's College, this appearance of top-heaviness is more generally noticeable ; not that the lens itself has anything to do with the matter, except in so far as it permits a nearer approach to the subject ; the point of view alone affects the question.

To give an example, let us suppose such an object as the

gateway depicted in the advertisement, measuring 60 feet in the height of the two turrets, and 30 feet between their external outlines. If such an object be observed from a distance of 120 feet, which is about the distance at which a medium angle lens would be available with comfort, the width of the two turrets at the top would, by rough calculation, subtend an angle equal to about 26 feet at the base, or nearly 4 feet less ; and, if the point of view were decreased to 60 feet, the distance at which a lens of wider angle would be required, the angle subtended would be equal to a width of about 21 feet at the base, or nearly 9 feet less. Although, in photographing such an object from these standpoints, owing to a variety of causes, the differences in measurements would not be so exaggerated, they are still very appreciable, and we have before us as we write a negative specially taken to illustrate the point. It represents a couple of windows of the same width, one above the other, the total height from the ground of the higher one being only 18 feet. The camera was placed 24 feet away, and carefully levelled, the image being gotten into position by raising the front as high as possible. At that comparatively low elevation there is a difference in measurements, when tested with a pair of dividers, of over a sixteenth of an inch, the upper window being, of course, the smaller, although to the eye it has the appearance of being much the wider.

From what we have said, it would be evident, to repeat Professor Allen's suggestion, that a compromise or slight re-adjustment may often be desirable, nay, even be absolutely necessary, and that a departure may be made from strictly vertical lines without committing any very heinous sin—if sin at all. It will be in the judicious use of, or abstention from, the swing back, or equivalent appliances, that the competent and artistic photographer will single himself out from the common herd, who will go on content to observe the golden rule of an invariably vertical focussing glass.

Of course, there are circumstances under which strictly perpendicular lines are almost a necessity, as when such fall near the margin of a picture, more especially in the case of lantern slides. What, for instance, could be more objectionable than a

cathedral interior with the pillars visibly falling away from the margin of the slide ? But, in such subjects as the one we have put forward as an example, there is no reason, but quite the reverse, why the slight readjustment should not be made. We have said that we gave up that subject in despair, not because we could not get swing enough, but simply because, do what we would, it invariably appeared to be wrong somewhere. The gateway of St. John's College forms a similar subject, but admits of free treatment ; but, even with that, we could not avoid the " swollen " appearance of the turrets, even though some slight departure from parallelism was indulged in.

Cambridge is rich in architectural test subjects, and probably one of the very finest to be found anywhere is King's College Chapel, either interior or exterior. On the same occasion already referred to, we secured two or three views of the river frontage from various standpoints, but in one of them, taken from the green (the nearest point of view, be it observed), the chapel presents to a slight extent the distorted effect to which we have referred, although in another picture, taken from the meadow on the other side of the river, it is entirely absent.

In another article we shall have something to say on other forms of distortion that have been laid to the charge of of the swing back.—" British Journal of Photography."

OUR PICTURE.

Our picture is from the celebrated studio of Gilbert & Bacon, Philadelphia, the work of Mr. E. H. Newell.

At the recent exposition at Trierer, Germany, it received the highest enconiums from the art critics for gracefulness and naturalness of pose, the characteristic arrangement of the drapery and the simplicity and beauty of the lines of corporation.

INDIRECT METHOD FOR THE REPRODUCTION OF COLOR BY PHOTOGRAPHY.

DR. J. M. EDER.

[From the "Wiener Photo. Blatter." Vienna.]

THE eye possesses not only the ability to distinguish between light and shade, but also the varieties of color ; that is to say, there are certain sets of nerve fibres which are sensitive to specific colors, each of a definite wave-length. According to the Young-Helmholz theory it is assumed that the endless gradations of shades of color which pass one into the other by imperceptible

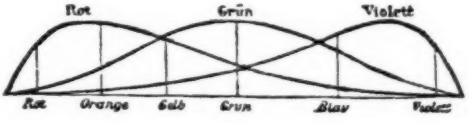


Fig. 1.

degrees in the pure spectrum may be referred to three fundamental areas of the retina, the terminals of nerve fibres of the optic nerve, viz., the red, green and violet, as indicated in the following curve of vision (fig. 1).

The horizontal line represents the visible spectrum, the curves above it are representative of each of the fundamental colors. If perpendiculars are erected, their intersection with curves will indicate the degree of intensity of each of the impressions of the special color of the spectrum upon the nerve elements of the retina.

These three color-qualities give with their entire united cynchromous action, the impression of white. All the other shades of color are produced by the various mixtures of these spectral fundamental impressions.

By certain colors the combination of two also gives the impression of white to the eye; for example, red and greenish blue, orange and cyanon blue, yellow and tridigo, greenish yellow and violet. These are called complementary colors. Pure green has no simple complementary color, but must be combined with two others—red and violet—to produce white.

These facts may be proved by so combining the special rays

of the spectrum by aid of lenses, and viewing the combined impression thus produced upon a suitable screen of pure white paper. The action upon the eye may thus be studied of the additive effect of the different colored images. The summative effect of all, however, is the purest white or colorless light; the absence of all the rays, black.

When we endeavor to represent the spectrum colors by aid of colored glass, we find we cannot produce them in their integrity. If we consider, for instance, the pure spectrum of white light of the electric arc, we shall find we have all the spectrum colors. By the aid of a Warnicke prism we are enabled to project the spectrum upon a white wall. If copper ruby glass is interposed, the violet, blue and green lights are absorbed, together with yellow green, merely the red, orange and yellow penetrating.

These three just mentioned, when combined, give the impression of fiery-red, although they are a mixture, and not an individual color. Aniline-red shows a decided absorption of the green, and allows the red, orange, yellow and also blue-violet to pass through, the color appearing to us bluish-red. Through green glass (chromate of copper) the red as well as the blue and violet are absorbed, whilst orange, yellow and green are transmitted. Blue cobalt glass absorbs the red, orange and green, but not equally, the absorption spectrum showing bands. In spite of this defectiveness of colored glass to represent the color spectrum in its proper intensity and degree, we can, nevertheless, indicate by the addition of the principal color, white as well as by partial mixture, color tones.

Prof. E. Valenta several years ago proved this by employing three projecting apparatus and using shades of red, green and yellow, super-imposed, throwing the impression upon a white wall. This also can be demonstrated by the newly devised Polychromoscope.

It consists of an apparatus provided with step-like rectangular tubes,—A, B, C,—whose ends are provided with colored glass ; for instance, at D a blue, at E a green, at F a red glass. Directly above these are placed photographic slides which have been photographed with reference to the special color of the object.

The impression is in shade, so that the color only is allowed to pass through the dark portions obstructing its passage.

If the chromoscope is placed in position and the light passed through the slides, the red image at C F falls upon the mirror 3, and is reflected in the direction G H, to the eye of the beholder. At 2 is placed a mirror of transparent plate glass which reflects the greatest part of the green-orange coming through B E to H; the same is the case with the blue image transmitted through the slide to 1.

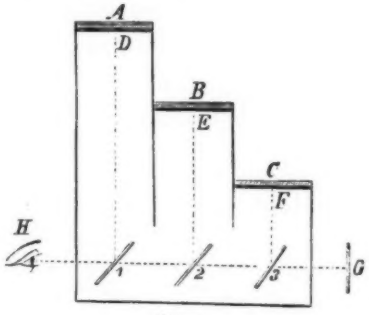


Fig. 2.

The image reflected by mirror 3 (red), must penetrate the two transparent mirrors 2 and 1 before it falls upon the eye. The green image has to pass through the plate 1; the blue image alone falls upon mirror 1, and is reflected directly to the eye.

Thus we are enabled, in a certain measure, to imitate in an optical way, the action of the eye in combining the color impressions. The summation of these three primary colors gives us all the variety of shades in a colored image. If, for instance, we should have three slides of the photographic image of a nosegay transmitted, we should receive the general impression of the various color values of all the flowers.

The case is quite different when we have to deal with a single source of light. (*To be continued.*)

ALVAN CLARK, the famous telescope lens maker, is dead. Although the Lick and Yerkes telescopes astounded the world with their magnitude, Mr. Clark was ambitious to produce one of still greater magnitude. But these wonderful instruments are monuments enough to his skill and painstaking work.

THE PIN-HOLE IMAGE THEORY IN SCREEN PROCESS PHOTOGRAPHY.

FREDERIC E. IVES.

CERTAINLY for eight years the writer has been teaching his pupils in half-tone block process that each aperture of his cross-line sealed screen might be regarded as a "pin-hole lens," forming a vignetted image of the lens diaphragm, and was also, he believes, the first to publish this idea, in a paper read at a Camera Club, in London, March 8th, 1884.

Emphasis was placed upon the statement of fact that, in order to obtain the best images of the lens aperture, with the least disturbance from diffraction, the screen must be held at a certain distance from the sensitive plate, this distance varying according to the character of the screen.

This theory has been generally accepted at the date of this writing, and it is perfectly true that, under the conditions stated, vignetted images of the diaphragm aperture are produced, and diffraction is not a seriously disturbing element in the calculations for controlling the gradations of light and shade in the negative.

Nevertheless, it is a mistake to assume that the screen aperture produces an ordinary pin-hole image at such a short distance as that at which the sensitive plate is placed, for it does not. The writer's first knowledge of this fact was communicated to him by Mr. Max Levy, who not only suspected the truth, but proved it by a series of ingenious experiments, recording the results by photo-micrography.

In Stokes' "On Light,"* pp. 46-70, is presented, without mathematics, and therefore comprehensible by everybody, a clear statement of all that part of the theory of diffraction necessary to an understanding of what takes place when the light rays pass through the screen aperture. All of it should be read, but a single paragraph explains one of the most interesting facts, viz., that at one screen distance the "pin-hole image" of a small circular diaphragm aperture (giving approximately parallel rays)

* McMillan & Co., London, 1887.

appears smaller and brighter than the screen aperture itself, while at other distances it becomes diffused or its centre even darkened. This paragraph (pp. 68,69) reads as follows :

" Reverting to the case in which light from a luminous point passes through a circular aperture, and is received on a screen beyond, consider the brightness at a point just in the axis on the receiving screen. If the relation between the two distances, already so often mentioned, and the diameter of the hole be such that the sum of the distances from the luminous point to the edge of the hole and thence to the central point on the receiving screen exceeds the direct distance from the luminous point to the latter by just half a wave's length, theory shows that the illumination is actually four times as great as if the screen in which the hole is pierced were taken away altogether. Suppose, now, the hole be enlarged. We might have said at first, supposing we were ignorant of the theory ' Of course, that must increase the illumination at the central point, or, at any rate, cannot diminish it.' On the contrary, it does diminish it ; and if the hole be enlarged till its area is just double what it was in the first instance, the centre of the illuminated space on the screen is a black spot. This theoretical result is easily realized in experiment ; only as the wave length varies from color to color ; and the proper distance of the receiving screen varies with the wave-length, when the screen is in adjustment for the brightest part of the spectrum it is not quite in adjustment for the fainter ends, so that the spot instead of being perfectly black is faintly purple."

It has been the writer's practice to expose for the shadows with a small circular diaphragm aperture, the screen distance being such as to give the smallest and brightest image of this aperture upon the sensitive plate, and to expose for the high lights with a diaphragm aperture of several times greater diameter. In this way a sharp, fine dot is always obtained in the shadows, even when the highlights have to be closed up by a supplementary exposure with a large diaphragm exposure.

It is evident, then, that although the modern screen process was brought to its present degree of perfection on the basis of the pin-hole image theory (a good working hypothesis), diffrac-

tion really plays an important part, actually improving the "pinhole image," or injuring, or almost destroying it, as the conditions are made favorable or unfavorable.—"The Practical Process Worker."

PYRO ASCENDANT.

THE appearance of the many new reducing agents, hydroquinone, metol, eikonogen, etc., has tempted many to test the validity of their claimed virtues over pyro, and when they find some dominant peculiarity, as, for instance, rapidity in calling forth the latent image, they are apt to forget the compensation which pyro has to offer in many other respects.

We fail to see what advantage there is in rapidity of action in development. The work done by rapid development is, as a rule, hard and blocky, and does not possess the delicate gradations obtained by mild action of the chemicals; and for slow development nothing is superior to pyro. Any degree of density of the image may be obtained, and when the desired point is reached, checked, without fear of having it reduced in fixing.

I have tried the various developers; have worked with them faithfully for fear of being behind the age, but have been compelled to return to pyro when on critical work which demanded great delicacy without flatness, detail in shadows as well as in the high lights.

There is nothing like weak fresh solutions of pyro for such work.

The following formulas will be found to work excellently.

Make a solution of sulphite of soda to test 60 by hydrometer, and a solution of carbonate of soda (sal. soda) to test 22.

Take (A)

Sulphite solution	4 ozs.
Sal. soda	4 ozs.

(B)

Pyro	1 oz.
Water	12 ozs.
Oxalic acid	10 grs.

For development take 80 ozs. of A to 8 drams of B for normal exposures. The image should not make its appearance before half a minute. It keeps on increasing in indensity so gradually that any change in the proportions may be made without injury to the plate.

I am not an advocate for sulphite in the pyro. It may give a prettier grey color to the negative, but it has a tendency to retard the power of giving density.

For securing great density with gelatine plates nothing equals pyro.

For black and white negatives the following formula will be found very effective:

(A) Pyro . . .. 1 oz.
Citric acid . .....60 grs.
Saturated solution of sulphite soda..... 8 ozs.

(B) Carbonate soda . ..... 4 ozs.
Sulphite soda . .....288 grs.
Bromide ammonium ..... 40 grs.
Water . . .. 32 ozs.

After development or before washing the plate is rubbed over with cotton dipped in acetic acid and water 1 dr. to 8 oz. water. Then place for two or three minutes in the same clearing bath, acetic acid and water, then wash under the tap and fix.

Pyrogallic acid in a very dilute form I have found far superior to the recent developers, even glycine, for protracted development. When the amount of pyro is very small in proportion to the quantity of water employed, there is no danger whatever from stain either to the hands or plates.

The method is applicable for instantaneous exposures, as well as for plates which have had a complete of hours, even, as in interiors. The negatives have a remarkably fine grain and a range of gradations even in the high lights far superior to ordinary rapidly developed plates, and then the cost is almost nothing considering the number of plates which may be developed in the same solution at the same time.

I have a box provided with grooves for the accommodation of various size plates, something like washing boxes, so that the plates may be inserted vertically. The plates do not rest on the bottom of the box, but there is a little space there to accommodate any sediment or dirt which might accidentally get in the solution.

Sufficient quantity of developer is poured over the plates to completely immerse them. It is constituted as follows:

For ordinary time or over-exposures:

Sulphite of soda, 1 fluid ounce.....10% solution.
Carbonate of potassa, 1 fluid ounce.....10% solution.
Water . .....1 gallon.
Dry pyro . .....12 grains.

For instantaneous exposures or supposed under-toned plates dilute the solution to 3 gallons of water.

The solution should be kept ice-cold during hot weather. I allow my plates to remain often for several hours, and have no frilling if the plates have no special inclination in that direction, but immediately after a slight rinse under the tap I place the negatives before fixing in solution of

chrome alum. A little better washing and bath is weak formaldehyde—will more effectually prevent frilling. Fix in cold hypo. This plan will be found very excellent for those who make a business of developing for amateurs, as the plates require no attention whatever after placing in the box until they are found completely developed. The grain by reason of the slow deposit makes the negatives especially valuable for bromide enlargements, the magnification showing no granulation whatever.

HENRY NIXON.

ACETYLENE GAS FOR PORTRAITURE.

MR. HENRY J. ROGERS, M.I.M.E., A.I.E.E., at the meeting of the Royal Photographic Society, exhibited his acetylene gas generator and an acetylene lamp for portraiture. He said: Calcium carbide, the material from which the gas is produced, is a hard, greyish, stone-like material, and it is made by exposing a mixture of lime and coke in fine powder to the intense heat of an electric furnace, under the influence of which the calcium of the lime and the coke or other form of carbon combine chemically with each other, and the molten residue consists of calcium carbide. This is removed from the furnace, and, when cooled and solidified, is broken up into lumps of a convenient size for use. On placing the carbide in water, acetylene gas is immediately given off, and this is brought about by a decomposition both of the water and of the carbide of calcium, the hydrogen of the water combining with the carbon to form acteylene, and the oxygen of the water combining with the calcium to produce ordinary lime, which is left as a residue in the generating vessel. A great deal too much has been made of the danger of acteylene gas. All the accidents that have occurred up to the present time, within my knowledge, have resulted from the storage of the gas at a very high pressure—as much as 50 or 60 atmospheres; but when it is generated in a small apparatus, the pressure being equal to only about two inches of water column, there is no danger whatever. When copper is used for the fittings an explosive gas is formed, from which danger might arise, but there is no necessity to use copper, as iron or brass are quite suitable for the purpose, and their employment is free from risk. The parabolic reflector of the lamp is made to swing in any direction, so that the focus point may be varied at will, and it is lined inside with asbestos and sewn with copper wire, and the flame can therefore have no injurious effect upon the reflector, which can be whitewashed if it becomes discolored. The lamp contains nine burners, each of which is capable of consuming from half a foot to one foot of gas per hour, and at the latter rate the light given by the whole is equal to 500 candle-power.

ON THE SELECTION OF A SUBJECT SUITABLE FOR A PHOTOGRAPHIC PICTURE.

(*Continued from last issue.*)

THE ground-glass focussing screen is truly a *tabula rasa*, a blank tablet from which one may very easily erase an objectionable feature, and in the exercise of our taste and judgment in determining the component parts of the photographic picture within the limits of those four rigid lines forming the rectangle, we are often glad of this facility of erasure by removal ; for it is only by removal and proper substitution that a harmonious relation of the parts can be secured.

BY STILL WATERS.

What disposition shall we make of the elements of the picture at our command ?

The easiest way of disposal is to arrange our models against a perfectly uniform background—one after the other, right about face, much in the manner of the mural paintings on the Egyp-

tian temples. But this we will not do, and we prefer to worry and sweat under the cloth a little while—in the exercise of our taste or judgment in the grouping to get a pleasing variety in the attitudes—to give them the look of ease and naturalness. We shall hardly be accused of lack of originality if we appropriate

FAIRY TALES.

those principles which have come to be accepted by artists as applicable to figure composition.

Whatever may be the subject of the picture, the eye is always attracted by the heads, therefore it is of the utmost importance to carefully consider their relative positions. The heads in a group should never be equi-distant, or so placed that imaginary

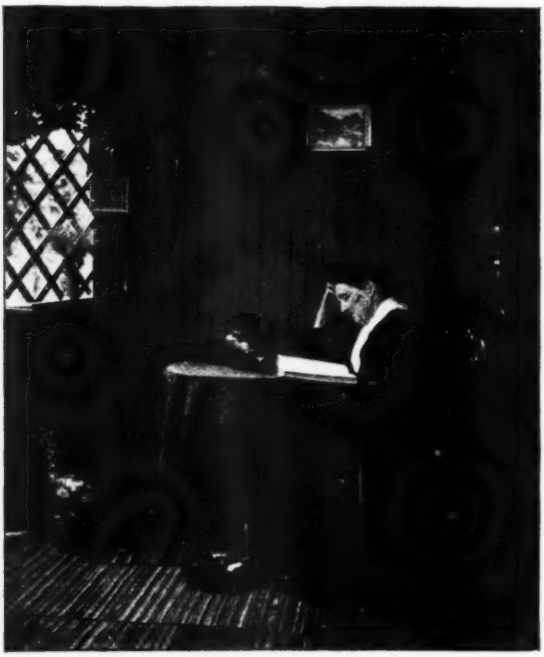
lines connecting them would form any regular geometric figure, as an arc of a circle, a square or a triangle. Such a distribution is almost as offensive to a trained artistic eye as the all-in-a-row arrangement. By simply shifting the position of the figures it is easy to break up this unpleasant symmetry.

CRONIES.

Two heads should never be in the same vertical line,—that is, one perpendicularly below the other. Suppose we have two figures: one standing, the other kneeling or sitting. We will give greater action to the group and more pleasure to the eye by bringing the head of the kneeling figure a little in advance of the standing.

If we have three figures to dispose of, two standing and one sitting, we should not arrange the group so that the sitting figure shall be equi-distant from the two standing ones.

Converging lines in a group are generally objectionable unless the convergence is necessary to the subject depicted. Where all the lines seem to radiate from one fixed point, the eye naturally turns there, and when it finds nothing of interest, disappointment follows.



EVENTIDE.

The management of the arms and hands, especially in a large group, is one of the most difficult problems to deal with. They cannot be put out of sight, but should be so disposed as not to attract special attention.

Sometimes in a group the arms and hands cross, but they

should never cross at right angles, and it should also be remembered that obtuse angles in a picture are more pleasing than acute.

Repetition of lines is generally to be avoided, although sometimes a repetition of the same attitude in a minor degree is quite effective by way of emphasis.

The art of grouping cannot be learned without considerable experience.

At first one has a general idea how the space is to be filled, then the details have to be worked up, and a change in an attitude may require a corresponding change in some or all of the others, until the original idea is abandoned for something else. Success is only attained by a continuous process of modification, addition, omission, substitution.

The principal figure of the group, that about which the others centre, should receive the most attention, but it is not necessary to place it in the centre of the picture, neither should it receive the greatest illumination. Unless the secondary or less important figures of the group are so arranged as to show their relation to the leading figure they will seem like trespassers upon the scene. Now as regards the size of the figures with reference to the dimensions of the plate. They should not be so large as to look cramped in the space allotted to them. Sufficient room should be given for seated or stooping figures to arise if they felt so disposed. The impression should never be conveyed that they would thereby endanger their heads by coming in contact with the top of the plate.

On the other hand the actors should not be so minute as to look stagey.

Finally, take care not to crowd the scene with too many items of interest. It is often a temptation to fill up an empty space, but frequently it is better to leave it alone.

JOHN BARTLETT.

PHOTOGRAPHING COINS, MEDALS, ETC.

BY GEORGE RAU.

In a recent communication to your magazine on the above subject the writer gives his experience after recounting the difficulties which beset him in trying to get rid of reflections from the polished surfaces. He declares that success was only finally obtained by indirect agency of plaster casts, from which electrotypes were made, and from these the photographs, but one nowadays seldom meets with an accommodating patron who is willing to pay the extra cost of the operation, and besides,

I do not think the results so obtained are by any means as perfect as direct reproductions. The delicate surface markings are often lost in the casting, and to the practical eye the final photograph has more the appearance of a copy than of an impression of the original.

To photograph such subjects demands primarily a proper arrangement of the light. A short account of my method of procedure may be of use to some other photographer when in a dilemna, for without experience he will find innumerable obstacles in his endeavor to secure a good illumination.

I prefer to place the objects on a piece of black velvet, and if the inscription is in relief arrange the copying board in such a position that the light falling upon the medal comes wholly from one side, or in other

words, have the side light predominate over the top light. Expose, giving full time, according to the degree of rapidity of the plate, and develop so as to secure contrast. If the medal is inscribed, or the inscription is engraved, the manipulations necessary for success are a little more troublesome. If it is desirable that the photograph of the medal should appear white and the inscription black, it is necessary to place a white cardboard in front of the lens, with an opening for the lens at an angle of 45 degrees laterally to the lens.

Let the sun shine on the card, the reflection of which on the medal will produce the desired result. It is not necessary to place the medal itself in a good light, for it is the reflected light which produces the good effect.

Of course care must be used not to let the sun shine directly in the lens.

This method will enable one to obtain in perfection the engraving on the coins, and I think it will be found to accomplish it much better than the plan of substitution of electros from plaster casts, or covering the casts themselves with plumbago.

ON THE PRESERVATION OF EXPOSED AND DEVELOPED PLATES ON A JOURNEY.

THERE is always some risk attending the transportation of exposed plates during a travel in foreign parts. One is not always able to satisfy the official propensity to pry and annoy. I recently took a trip to Europe, and of course took with me a small stock of plates. I was afraid to risk films—and fearful of the customs inquisition; I thought it best to develop my exposures, and not have them ruined by exposure to light.

I had read a good deal about the method of preserving the exposures by flowing over the plate with weak bichromate of potassa and other

substances, but these plans seemed to me quite as troublesome as developing right out. I had heard a good deal about the immunity of developed and washed but unfixed plates to a moderate light,—how that if a plate was well washed in water from the developer, and dried, it might be exposed to considerable light without the image being fogged; kept any length of time, and then fixed at convenience with as good final results as if the operation had been done at the exposure. I at once concluded that if this were the case, certainly there was less risk of ruin than with imperfect fixation and washing, so I determined to risk it on this journey. I developed my exposures in my hotel room, making use of a roll of ruby fabric with a candle behind it; a cylinder of about six inches in diameter, fastened at the base to a round collar box; a few holes in it for ventilation, not bothering to shut off the light from the top, which, reflected from the ceiling some feet away, would be too weak to affect a plate.

After developing to the proper intensity I first wiped off the surface with a wet sponge; then washed in three changes of water, to which a little hydrochloric acid had been added, and dried the plates. On repacking in the boxes I placed a piece of black paper on top, so as to avoid danger from unnecessary exposure; but I believe this precaution was useless. But what is of most interest, my plates, though subjected to a number of daylight examinations, were not hurt in the least, and on fixation at home were as clear and transparent as fresh fixed plates.

On recounting my experience to Mr. George Ennis, superintendent of the establishment of William H. Rau, he narrated to me some of his experiences of wet day photography.

It is necessary as you know to develop and wash a collodion negative immediately. The washing checks the development just as in dry-plate practice. On one occasion, after developing the exposure and washing the negative, he was not pleased with the result. He did not run his finger across the film as usual, but placed it against a shelf, where the film dried. Subsequently, on examining the negative, it occurred to him that it was possible to print directly from it without fixing. It was placed in a frame with silver paper, and an impression received, but it took much longer to print from than a fixed negative. Here the strong action of the sun had no effect, but I do not believe a dry-plate would stand such procedure. I have had developed, well washed negatives lying around for months, all the time exposed to rather strong light, but not direct sun, and no obliteration of the image has taken place.

The only difference I have noticed in such plates is a greater density than with fresh fixed ones. I cannot understand this protecting action of the appropriated developer. It seems to me that there ought to be still some unaffected bromide present which would cause fog. How

careful the instruction books are in cautioning you to exclude light even from the washed plate, but I have noticed that professionals frequently open the sash to look at a washed developed plate.

F. E. B., Philadelphia.

THE REPRESENTATION OF MOTION IN PHOTOGRAPHY.

WHILE photographs of objects in a state of motion have been everywhere taken and exhibited, often with a certain degree of superfluous pride, it is only occasionally that one finds a photographic picture really forcibly conveying to the eye, and thence to the mind, the idea of motion. They are for the most part snap-shots and nothing more, showing people, animals or other things in what might be termed a crystallized state, conveying rather the notion of movement arrested than of genuine motion. The poetry of motion is wanting, and there is no art in them. The question may be asked, is it possible to adequately represent motion by means of the camera; can the lens and sensitive film give a true impression, that is, one corresponding with that seen by the human eye? The answer we give is that it can, and the truth of the statement can be proved by the few examples selected from illustrations we had by us at the moment, and emphasized, if need be, by a careful examination of a larger number of examples; for although the majority of photographers fail in regard to this representation, some few are successful, and if the matter were regarded in a proper light much better work might be done, but just so long as the rank and file continue to regard the great speed of their shutters as of greater interest than the ultimate effect of the picture taken, just so long will there be a neglected field of artistic representation lying fallow so far as photography is concerned.

So far as we know but little has been written in regard to the representation of motion in photography, and in consequence we have read with that zest which novelty imparts, a paper given a couple of months ago before the Photographic Society of Philadelphia by John Bartlett, the gist of which we republish here. But a perusal of the whole is recommended. It will be found in the AMERICAN JOURNAL OF PHOTOGRAPHY for April.—*Practical Photographer.*

[We highly appreciate the kind remarks of the editor of the *Practical Photographer* (Matthew Surface), and feel gratified that he has illustrated our paper with such excellent examples of motion in photography. One of the cuts is the finest impression of the idea of motion which photography has produced.—ED.]

FORMULÆ FOR RAPID FERROTYPES.

The ferrotype is still the favorite form of photography at the sea shore and other summer resorts. The following formulæ will be found of practical value.

Bromo-Iodide of Silver Collodion.—For instantaneous ferrotype plates. Dissolve 120 grains bromide of potassium in 3 ounces of water; dissolve 120 grains of nitrate of silver in 3 ounces of water; pour the bromide of potassium solution into the silver solution, little by little, until it is done curdling; let it settle; pour off the water; wash three times with water, letting it settle each time; then three times with alcohol, after which add 16 ounces alcohol and 1½ ounces of iodide of potassium, ground up like powder; shake well for half an hour; stand by in the dark for a day or so, when it will be ready for use.

Plain Collodion.—Alcohol 9 ounces, ether 16 ounces, cotton 240 grains. To 16 ounces of this collodion add 2½ ounces of the above exciting; shake well. Dissolve 30 grains bromide of potassium in as little water as possible; add to this, shaking well after each addition; then let settle.

Bath.—One ounce nitrate of silver, dissolve in 12 ounces of water; dissolve 3 grains iodide or potassium in ½ dram of water; pour it in the solution; shake well; let it stand a day in the dark; then filter, after which it is ready for use.

Developer:

Water	64 ozs.
Sulphate iron	6 ozs.
Acetic acid	7 ozs.
Alcohol	6 ozs.

A very sensitive collodion for ferrotype plates may be made by adding two or three drops of iodide of iron to every 2 ounces of ordinary ferrotype collodion, shaking well.

The collodion must be kept in the dark, and only a small quantity made at a time as it very easily decomposes. GEORGE RAU.

Mr. R. A. Anthony, of *Anthony's Photographic Bulletin*, who has just returned from Paris and London, whither he went to secure for the Americas the new "Radiotint" color process in photography, described in the various journals, has brought with him from M. Chassagne's laboratory quite a collection of photographs colored by the new method, which are to be seen at his office. These photographs, we believe, will be conceded by all to be in every way remarkable. One of these prints was developed by Mr. Anthony in twenty-five minutes, and shows conclu-

sively what may be done by one who is entirely unfamiliar with practical photographic manipulation. Another of these prints, a portrait of the Czar of Russia, Mr. Anthony tells us, shows very remarkably the color and effect of real life, the flesh tints being particularly good, and the drapery perfect, both in color and tone rendering. A landscape, rich in brilliant lighting and strong in deep shadows, with all the various shades of green in the foliage, intermediate tones and reflections in the water, is also described as exquisite. The collection is well worth the effort required to view it.

Mr. Anthony tells us that materials for the working of this process will be available about July 1st of this year, and that the cost of the same will be within the reach of all.

HISTORY OF THE HALFTONE DOT.

(Continued from June number.)

The earliest reference to the theory is, as I have told you, by Mr. Ives in Philadelphia, 1888, and the earliest reference to the subject in England was by the same gentleman in the *Journal of the Camera Club*, in April, 1894. He then stated that it was as easy to make a single line block from a cross line screen as from a single line screen. The real explanation of this peculiar power of the cross line screen lies in its function as a cross line screen to produce minute pinhole images of the aperture in the diaphragm upon the sensitive plate. At a certain distance between the screen and plate the screen will produce the image of any shape or aperture in the diaphragm that may be desired. Therefore if an aperture be made in the diaphragm at such an angle as to be parallel with one set of lines of the cross line screen and of a certain width, the images of such apertures on the sensitive plate will so overlap one another as to obliterate the contrary lines on the screen.

By adjusting the length and width of the aperture in the diaphragm, *i.e.*, by having a set of diaphragms with different-sized apertures, it is possible to obtain the following results :—

(*a*) Negatives in a single smooth graduated line.

(*b*) Negatives with a single line continuous through the middle shades, and dotted off into the lighter shades.

(*c*) Negatives with a cross line dot in which one series of lines is more pronounced than the other.

The particular application of the stops that Mr. Ives mentions is in regard to color-work, and therefore he does not treat of such stops as are used to-day in black and white half-tone, but the theory nevertheless applies.

Mr. Max Levy made the next most important contribution to the subject in an article published in *Paper and Press*, Philadelphia, in December, 1894, and afterwards in *The Process Year Book*, 1895.

Whilst accepting the pinhole theory of Mr. Ives to account for the shape of the dot, Mr. Levy started another theory, that of diffraction, to account for the fact that the dots varied in size. Mr. Levy went on to say: "The images of the lens aperture formed through the openings in the screen would be much sharper than they really are, were it not for the important part played by the diffracted light at the short distance from the apertures at which the image is intercepted, and it is this diffraction which produces the effect of larger and smaller images instead of only stronger and weaker ones, as would be the case if there were no action of deflected light."

I think Professor Burton comes next in order in discussing this matter in a paper he sent to one of the London Photographic Societies, early in 1895.

"Briefly stated," said Prof. Burton, "it must of course be admitted that the image, as a whole, is a dioptric image, formed in the way of ordinary photographic images, which can be traced geometrically by following the pencils of light. I believe, however, that the individual dots are not dioptrically found, but are diffraction images of the diaphragm of the lens. If this be not so—or at least if the dots be dioptrically formed—why should not contact with the plate be the best position for the screen? And, still more, why should alteration of the distance make so marked a change, in not only the size but the shape of the dots? A change not to be accounted for dioptrically. I have a confirmation of my theory in the peculiar form and position taken by the dots that represent the well-defined boundary line between a strongly contrasted light and dark shade or tone."

Messrs. Tallent and Dollond, of the Polytechnic, had been pursuing investigations into the subject, and on April 23d brought before this Society a paper recording their results. They worked to the theory of shadows and penumbra, and regarded the action of the screen from the point of view that a cone of light proceeded from the diaphragm through the screen, and had its apex on the sensitive plate. When the position of the screen was so adjusted that this cone passed through the screen apertures with the least obstruction—that is to say, a section of the cone at the point where it cut the screen fitted the opening—there was maximum intensity of illumination, and consequently the correct relationship between screen and diaphragm. Mr. Dollond stated they had made no absolute experiments with regard to diffraction, but, as their experimental results agreed closely with calculated results, not allowing for diffraction, he thought there was no appreciable effect.

Almost simultaneously with the last-mentioned paper appeared an English translation of Dr. Eder's famous article on the subject. The gist of Dr. Eder's conclusions was that the dots are actually the pinhole images of the diaphragm and the penumbral cone crossing in front of the screen aperture, and gradually becoming weaker at the edges, broadens the dot according to the brightness of the light and the length of exposure, diffraction phenomena playing only a secondary part.

Mr. Deville, the Surveyor-General of Canada, read a paper on May 17th, 1895, before the Royal Society of Canada, on the same subject, basing his theory on the geometrical shadow of the screen. He said :

" The object of the process is to break the continuous tones of an original into equivalent tones consisting of white and black dots suitable for printing in the typographic press. For this purpose, the original is copied in the camera, but a short distance in front of the sensitive plate a screen is inserted consisting of minute opaque and transparent figures ; it is adjusted to project a diffused shadow over the plate, the light being strongest under the transparent parts and weakest under the opaque parts, with varying degrees of intensity between. Whatever may be the subsequent operations, the result, if they have been properly performed, is that all parts of the print corresponding to those parts of the photographic plate which have received less than a certain amount of illumination are covered with ink, while for all parts which have received more than the said amount of illumination the surface of the paper is left bare. Illumination means here the product of the intensity of light by the time of exposure.

" The first question that arises is this : How does the illumination vary within the shadow of the screen ?

" In copying a subject in the camera, the aperture of the lens diaphragm may be taken as the source of illumination ; seen from a point of the photographic plate, its whole surface appears evenly illuminated, if the subject is properly focussed, the illumination being proportional to the intensity of the light sent by the corresponding point of the subject."

Prof. Burton, in regard to the latter clause of his proposition, is exactly in accordance with Mr. Max Levy upon the point that the finer the lines of the screen or, in other words, the closer the openings, the more diffraction there will be.

The investigations of Turati into the influence of the shape of the stop and of multiple apertures in changing the character of the grain, are interesting, but they are not important for our present consideration because the theory is the same as first laid down by Ives and Levy.

An article by Mr. Ives in *Scovill's International Annual* for 1886 is interesting, because he there acknowledges that his old theory of pinholes

does not account for everything in the action of the screen, and he accepts Levy's idea of diffraction.

I do not think that the conclusions on the theory of either pinholes or penumbra are absolute. Both fail to account for the fact that good half-tone negatives—I will go so far as to say the best—are made at distances which preclude the possibility of penumbral or pinhole calculations working out correctly.

If the dots were to be accounted for entirely on the theory of pinholes, one screen distance would suit at all times, if the diaphragm were enlarged or reduced in proportion to the camera extension; and, further, if we doubled the size of the diaphragm, we should double the size of the dot, which is not the case, as Dr. Eder has correctly pointed out.

Again, if the dots are to be accounted for by penumbra, either in conjunction with or apart from, pinhole effect, we do not account for the fact that we can get dots considerably smaller, as well as considerably larger, than the screen-opening, and of almost equal density and sharpness.

According to the penumbral theory, the more we enlarge the diaphragm the greater will be the spreading of the dot, whilst the more we reduce the diaphragm, the more sharply we make the dot conform to the size and shape of the screen-opening; but under no circumstances can it be urged, on the penumbral or pinhole theory, that a small stop would give a dot smaller than the screen-opening, nor that the dot formed by the small stop would be otherwise than of the shape of the screen-opening.

Yet it is a fact that a round dot smaller than the screen-opening can be produced in the shadows, whilst, at the same screen-distance, a dot as much larger than the screen-opening as desired can be produced by enlarging the diaphragm. This effect is obtained by a method tending to promote diffraction, and, in fact, at a screen-distance and with an aperture that would give the maximum amount of diffraction, if we sought for diffraction alone. A further curious fact, not accountable on any theory of penumbra or pinhole, is that the tiniest diaphragm, say, one-sixteenth of an inch in diameter, will, at the proper distance, produce more density in the same time than will a diaphragm double the size at a screen-distance calculated on the rules laid down by Dr. Eder.

It is further a fact that more tone and detail will be obtained, and with quicker exposures, by working according to the diffraction theory than according to the penumbral theory. The difference between the one theory and the other is that, by accepting diffraction as a factor, we work for the shadows, and eventually get the high lights, but by the other way we work for the high lights, and never get the shadows at all except by fictitious means.

(To be concluded.)

The Journal of the Camera Club has cast its slough, and appears in an entirely new habiliment and under a new name; hereafter it will be known as *Camera Notes*. It has been deemed advisable to enlarge the scope of the official organ of this enterprising Club in several ways. First, as to regularity of issue. It has had hitherto, as the editor facetiously remarks, a sort of cometary orbit, flashing occasionally into view at unexpected intervals, but from now on it will become a regular planet, making complete revolutions four times a year.

It is also proposed to publish with each number two photogravures, representing some important achievement in pictorial photography chosen from the best material the world affords.

Articles of special interest (illustrated) will also appear, and the Journal will be made in every way acceptable and valuable to all interested in the art.

The July number contains a very interesting judicious and amusing criticism of the "Latest Process of Color Photography Genuine," by Walter E. Woodbury.

The illustrations are excellent, especially a picturesque view of an old mill by Alfred Stieglitz.

In the Twilight Hour.

Innocence of life, consciousness of worth and great expectations are the best foundation of courage.

The only passion which age does not blunt is avarice, and which, the longer we live, only becomes the keener.

A man who sells his conscience for his interest will sell it for his pleasure. A man who will betray his country, will betray his friend.

Despise not any man, and do not spurn anything, for there is no man who hath not his hour, nor is there anything that hath not its place.

"We please our fancy with ideal webs
Of innovation; but our life meanwhile
Is in the loom, where busy passion plies
The shuttle to and fro, and gives our deeds
The accustom'd pattern."

Do not all that you can do; spend not all that you have; believe not all that you hear; and tell not all that you know.

There are peculiar ways in men which exhibit what they are through the most subtle faults and closest disguises.

Contentment is a pearl of great price, and whoever procures it, at the expense of one thousand desires, makes a wise and happy purchase.

Even in the fiercest uproar of our stormy passions, conscience, though in her softest whispers, gives to the supremacy of rectitude the voice of an undying testimony.

"Let no flower of the spring pass by us; let us crown ourselves with rose-buds before they be withered.'

—*Book of Wisdom.*

BARGAIN LIST.—JULY, 1897.

PORTRAIT CAMERAS.

[For Lenses see Special List.]

1—11x14 Scovill Port. Camera, Bonanza holder, ... $35 00
1—11x14 Anthony Port. Camera, Benster holder, ... 30 00
1—14x17 D. S. B. Portrait Camera, 40 00
1—5x8 Wet Plate Stereo. Camera, 3 holders, ... 20 00

VIEW CAMERAS.

1—Rex Magazine Camera . . . 8 00
1—6½ x 8½ Blair Rev. Back Camera, Beck lens, 6 holders and tripod 35 00
1—5x7 Eastman R. B. Camera, 3 Holders, Steinheil lens, tripod, 35 00
1—5x7 Ideal, 2 extra holders and special case, ... 19 00
1—5x7 Blair, plain back, front focus, lens and tripod, . . . 8 00
1—22x28 American Opt. Co. View Camera, 22x28 Francais lens, 150 00
1—11x14 Flammang R. B. Camera, 4 holders, tripod, Euryscope lens. Prosch shutter, . 100 00
1—5x8 Blair Lucidograph, . . . 4 00
1—4x5 New Model, ... 6 00
1—8x10 Blair, Rev. Back, good order, ... 18 00
1—5x8 Wet Plate Stereo Camera, 1 pair Darlot lenses, 1 5x8 Darlot lenses, ... 10 00
1—4 x 5 New Model Outfit, . . 6 50
1—6½x8½ Novelette Camera, two (2) extra Holders, Beck R. R. Lens, Canvas Case, in good condition. Cost $107.00. Will sell for 60 00
1—4x5 New Model Imp. Camera, Wray lens, 6 extra holders, . 34 00
1—5x8 Genessee Outfit, 3 extra holders 13 00
6—⅛ Scovill light-weight film holders, each 1 00
1—Takiv Magazine Camera, . . 2 50
1—Peep-a-Boo Camera, ... 2 50
1—5x8 Blair Camera, with 6½x8½ extension and 12 holders, . . 25 00
1—6½x8½ View and 2 holders . 8 00
1—5x8 New Model Camera, . . 10 00
1—5x8 Blair Single Swing View Camera 10 00
1—6½ x 8½ American Optical Co.'s View Camera, ... $15 00
1—5x8 Boston Rev. Back Camera, new, with Orthoscope lens, . 28 00
1—Student Camera, complete . . 1 50

HAND CAMERAS.

1—Bull's Eye '97 and Case . . 8 00
1—4x5 Cycle Poco R. R. lens, 6 holders, ... 18 00
1—No. 4 Kodak, good as new, . 22 00
1—Night Hawk Camera, . . . 3 00
1—5x7 Folding Premo, R R lens, 24 00
1—4x5 Waterbury Detective Camera, 3 holders, ... 8 00
1—No. 1 Kodak, ... 5 00
1—5x7 Folding Kodak, new, . . 45 00
1—4x5 Turnover Detective, new, 10 00
1—4x5 Climax Detective, new, 10 00
1—6½x8½ Premo Sr, no lens . 28 00

ACCESSORIES.

1—Air Brush and Pump 18 00
1—Case for Sliding Tripod . . . 1 00
1—4x5 Roll Holder for Hawk Eye 5 00
6—Scovill Light-weight Holders, each, ... 70
1—Photoscript, ... 2 00
1—Wood Stereo Exposer, . . . 50
3—Cross Collodion Filters, . each 1 00
1—11x14 Glass Bath, ... 2 00
2—12x15 Glass Baths, . . . each 3 00
2—10x12 Printing Frames, each 50
2—14x17 " " " 1 25
1—Eastman 4 fold tripod, . . . 4 00
1—Pair large Beam Scales, 14 in., 2 00
1—McKee Embossing Press . . 8 00
1—4¼ x5½ Eastman Roll Holder, 2 75
6—5x8 Scovill Film Holders, . . 6 00
1—6x8 Cloud Vignetting Ground, 3 00
1—906, 8x14, Ground . . . 8 00
1—5x6 Burlap Ground 3 00
1—Anthony's Electric Retoucher, 15 00
3¼x4¼ Washing Boxes, each, 50
2—Large Oak Show Frames, each 5 00
1—Cooper Enlarging Bromide Lantern, 5½ in. condenser . 25 00
1—15-in. Improved Eureka Burnisher 25 00
1—Acme Print Trimmer, new, . 9 50
1—Baldwin Print Cutter, new, . 10 00
Lot of Picture Mats. Write for particulars.
1—18x22 Printing Frame, . . . 2 50
1—8x10 Printing Frame, ... 40
1—14x17 Adaptable Washing Box 4 50
2—6x8 Children's Backgrounds, 3 00 and 4 00

1—Wall Accessory, ... $ 4 00
1—Daisy Foreground, ... 4 00
1—Seavey Swiss Cottage 5 00
1—Osborne's Rock Accessory, . 8 00
1—Osborne's Pillar Accessory . . 8 00
Lot of second-hand backgrounds, 8x10 and 6x8, $3.00 to $6.00; write for particulars.
Peerless Varnish Pots, each . . . 40
1—4¼x5½ Negative Box . . . 35
1—Walmsley Reversible Finder . 2 50
1—Card-size Burnisher 3 00
1—22x28 Moorehouse Display Album, ... 9 00

Bargains in Lenses.

1 Set 1x9 Gem Lenses 15 00
1—14x17 Portrait Lens 25 00
1—11x14 Rapid Rect. Lens, . . 20 00
1—16x20 Rapid Rect. Lens, . . 30 00
1—Imitation Dallmeyer Lens, size 3¼x4¼ 6 00
1—No. 1 Gray's Extreme Angle Periscope Lens; list $24.00, . 16 00
1—9 in. focus Ross Portable Symmetrical; list $46.00, ... 30 00
1—5x8 Zeiss lens, series 3, . . . 45 00
1—8x10 LeClaire Lens, ... 10 00
1—4x5 Bausch & Lomb Shutter, . 8 00
1—4x5 Gundlach R. R. Star, . . 6 50
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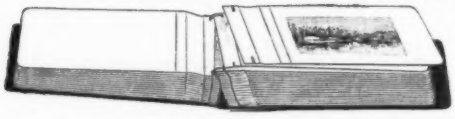

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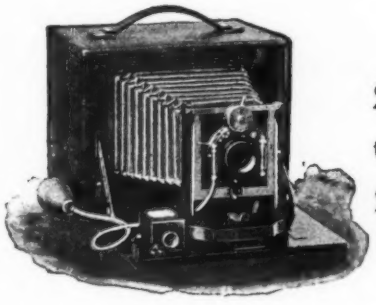

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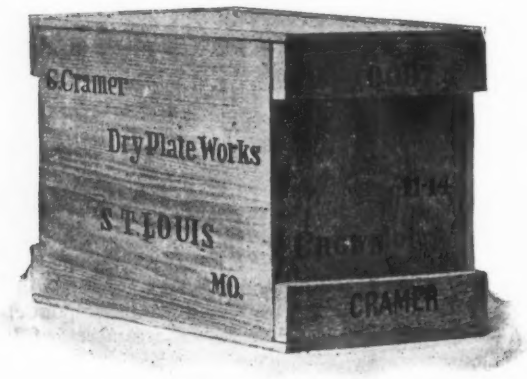

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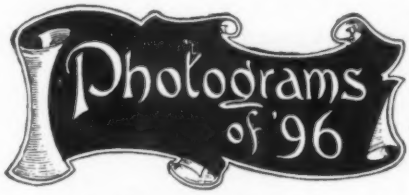

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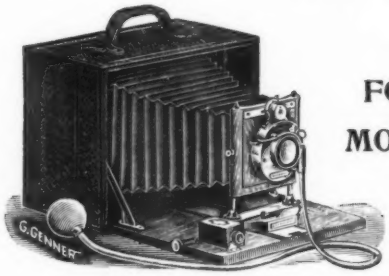

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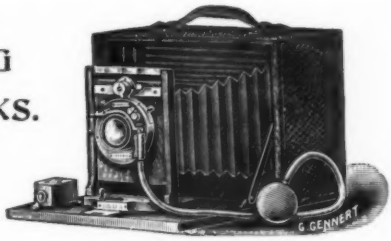

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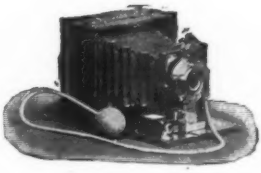

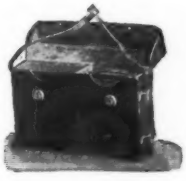

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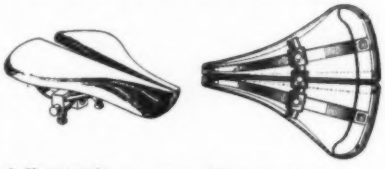

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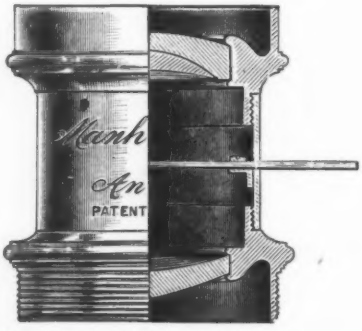

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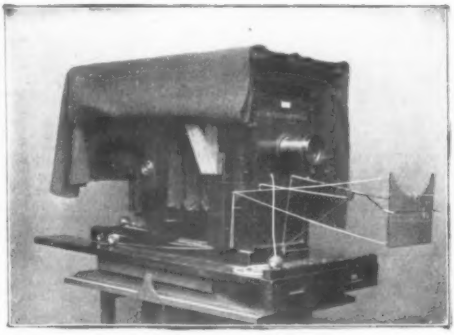

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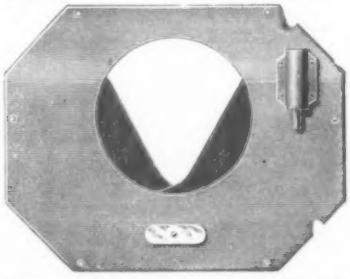

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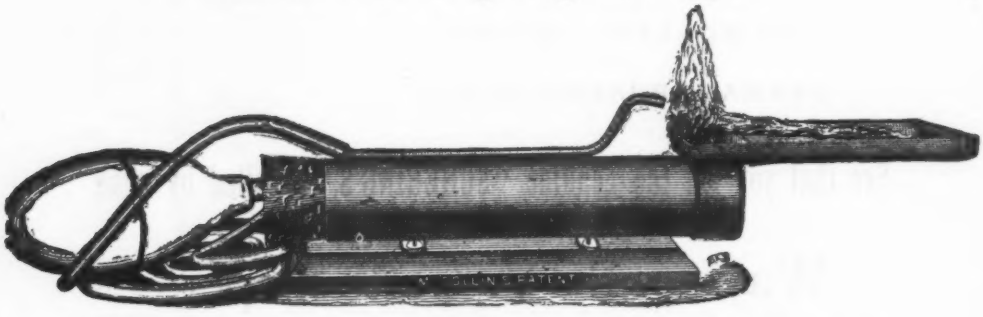

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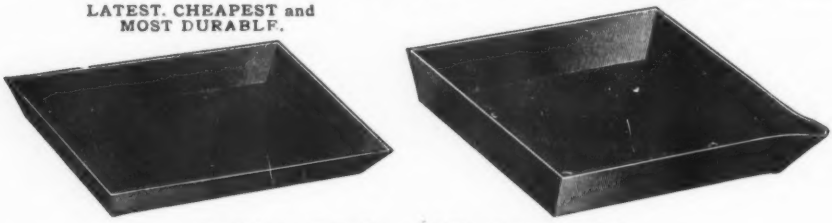

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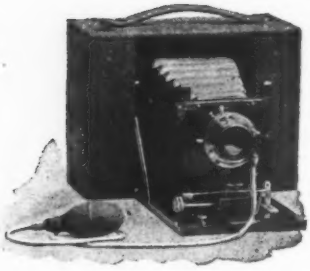

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